REMARKS

The present amendment and request for reconsideration is filed in response to the final Office Action mailed May 20, 2004.

Applicants' attorney wishes to thank the Examiner for the telephone interview of June 19, 2004, with the undersigned and Frank Schellenberg, Ph.D., a technical representative and patent agent of Mentor Graphics Corporation, the assignee of the present application. During the telephone interview, the operation of the present invention to reduce the size of a file that is provided to a mask writing tool by selectively reducing the hierarchy of, or partially flattening, a hierarchical input file was discussed and compared to the cited reference, U.S. Patent No. 6,370,679. The differences of the present invention versus the '679 patent were discussed with respect to Claim 35, but no agreement was reached. The Examiner indicated that she would consider the differences discussed when a written response was filed. In this amendment, applicants have amended Claims 35, 39, 41, 44, 46, 47 and 49 in light of the Examiner's interpretation of the prior art and applicants' invention, and is therefore proper after the final rejection.

In the Office Action of May 20, 2004, Claims 35, 41, 46, 48 and 49 were objected to for minor informalities. Applicants have amended the claims to address the Examiner's concerns. It is therefore requested that the Examiner withdraw the objections.

Claims 46, 47 and 49 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Examiner has indicated that the specification does not reasonably convey to one of ordinary skill in the art, at the time the application was filed, that the inventors had possession of the invention. Specifically, the Examiner states that "since the hierarchy of the input data file is preserved from start to the end of the process, the specification fails to disclose the step of 'reducing the hierarchy of the input

-10-

file to include a number of selected cells and one or more remainder cells'". Applicants respectfully traverse the rejection.

As discussed in the telephone interview, the present invention operates to reduce the size of a file that is transmitted to a mask writing tool for use in producing a layer of a device by selectively reducing the hierarchy of an input data file. In the described embodiment of the invention, the hierarchy is reduced to one or more selected cells and one or more remainder cells, and their placements. It is submitted that those of ordinary skill in the art will recognize that the hierarchy of an input file, as shown by example in FIGURES 3A-3F, versus the output file that is represented by FIGURES 5B, 5C, and 5D, is reduced in hierarchy from three levels to two. Because the present invention does reduce the hierarchy of the file that is provided to the mask writer versus the hierarchy of the input file, it is requested that the Examiner withdraw the rejection.

Claims 35-49 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Specifically, the Examiner has objected to the phrase "may include references to other cells." Applicants respectfully traverse the rejection. As can be seen in FIGURES 3A-3F, each of the cells A, B, and C define polygons representing objects to be created in a layer of an integrated device. Some cells, including the top cell T and cell B, refer to other cells. Conversely, cells A and C do not contain references to other cells in a hierarchical tree structure. As will be appreciated, those cells at the leaves of the hierarchical tree do not refer to other cells, while other cells in the tree do refer to other cells. Applicants believe that the claims as presently worded are clear to those of ordinary skill in the art.

Claims 38, 39, 43, and 44 were rejected as being incomplete for omitting an essential structural cooperative relationship of the elements therefore amounting to a gap between necessary structural elements. Specifically, the Examiner indicates that there is a functional

-11-

problem between the limitation of "cells that are repeated in a layer of the integrated circuit" and cells that maximize/minimize the area/time required to write modified/selected cells on the mask. Applicants respectfully traverse the rejection. Each of Claims 38, 39, 43, and 44 define specific ways of choosing the selected cells to be modified and used with the one or more remainder cells. As described at page 7, line 17 - page 11, line 33, any cell in the hierarchical input file can be considered for selection. However, if the selected cells are too small, the time required to write all the placements of the cells on the mask increases. If the area of the selected cell is too large, then the time required to transfer its description to the mask writing tool can take too long. These are at least two of the competing criteria by which the cells of the layer are selected. Applicants believe that Claims 38 and 43 are clear. Applicants have amended Claim 39 and 44 to positively recite the step of determining the area that is would be occupied by each cell and the time required to write the placements of each cell on the mask to provide antecedent basis for the remainder of the claims. Applicants therefore believe that Claims 38, 39, 43, and 44 do not create a gap between necessary structural connections. If the Examiner has any additional questions on this point, she is invited to call applicants' attorney at the number listed below.

Claims 35-39 were rejected under 35 U.S.C. § 102(e) as being anticipated by Chang et al., U.S. Patent No. 6,370,679. Applicants respectfully traverse the rejection. As discussed in the telephone interview, the Chang reference describes a data hierarchy layer correction and verification apparatus that maintains the original hierarchy of a data input file. As can be seen in FIGURE 3 of the Chang patent, the original hierarchical data 205 is used to produce a hierarchical correction data 260 having the same structure. Specifically, the tree structure shown at the top of box 205 is the same as the tree structure shown at the top of box 260, wherein each cell is shown as being modified by a delta. However, the overall hierarchy remains the same. See also, Col. 8, lines 39-40, Col. 10, lines 48-52. Similarly, because the hierarchy is the same,

-12-

there is no creation of one or more remainder cells. Upon completion of the hierarchical correction data, the data is flattened prior to transmission to a mask writing tool. See step 280 in FIGURE 2; Col. 11, lines 53-59; and Col. 16, lines 54-56 of the Chang patent. When the data file is flattened, all hierarchy is lost and the size of the file that must be transmitted to the mask-writing tool is increased.

With respect to Claim 35, it is submitted that the Chang et al. reference does not teach or suggest the combination of method steps including modifying selected cells of a hierarchical input file to include polygons or portions thereof found in the overlapping placements of non-selected cells and the placements of selected cells, creating one or more remainder cells to include polygons or portions thereof defined in the placements of non-selected cells that are not within the modified, selected cells and creating a file for use by a mask-writing tool by eliminating the non-selected cells such that the description of the modified, selected cells and the one or more remainder cells with their placements describe a layer of the integrated circuit. Absent a teaching or suggestion of this claimed combination, it is submitted that the reference cannot anticipate Claim 35 or the claims that depend thereon.

With respect to Claim 41, it is submitted that the '679 patent does not teach or suggest a computer-readable medium containing instructions that cause a computer to modify selected cells to include polygons or portions thereof found in overlapping placements of non-selected cells and the placements of the selected cells, creating one or more remainder cells to include polygons or portions thereof defined in the placements of non-selected cells that are not within the modified selected cells and creating a file for use by a mask writing tool by eliminating the non-selected cells such that the description of the modified, selected cells and the one or more remainder cells with their placement describe a layer of an integrated circuit. It is therefore submitted that Claim 41 and the claims that depend thereon are allowable.

-13-

MEGC\16848AM3.DOC

With respect to Claim 46, it is submitted that the '679 patent does not teach or suggest a method of preparing a file by reducing the hierarchy of the input file by selecting a number of cells, modifying the selected cells by incorporating polygons or portions thereof defined in non-selected cells having extents that overlap the extents of the selected cells, and creating one or more remainder cells including polygons or portions thereof that are not defined in the modified selected cells, and creating a file for use by a mask writer that describes a layer of the integrated circuit by including the selected cells and the one or more remainder cells, and their placements. Therefore, Claim 46 is allowable.

With respect to Claim 47, it is submitted that the '679 patent does not teach or suggest a computer-readable medium including a number of instructions that, when executed by a computer, cause the computer to perform a method of preparing a file that describes a layer of an integrated circuit by reducing the hierarchy of the input file to include a number of selected cells defining a number of polygons, modifying the selected cells to include polygons or portions thereof defined in the non-selected cells having placements that overlap the placements of the selected cells and one or more remainder cells having polygons or portions thereof that are not defined in the selected cells and creating the file for use by a mask writer that describes a layer of an integrated circuit by including selected cells, the one or more remainder cells, and their placements. Therefore, Claim 47 is allowable.

With respect to Claim 48, it is submitted that the cited '679 patent does not teach or suggest a file that describes a layer of an integrated circuit wherein the file is created by selecting one or more cells from a hierarchical input file, modifying the selected cells to include polygons or portions thereof found in overlapping placements of non-selected cells and placements of selected cells, creating one or more remainder cells to include polygons or portions thereof

-14-

defined in the placements of non-selected cells that are not within the modified, selected cells and creating a file for use by a mask writing tool by eliminating the non-selected cells such that the description of the modified, selected cells and the one or more remainder cells with their placements describe the layer of the integrated circuit. Therefore, Claim 48 is allowable

Finally, with respect to Claim 49, it is submitted that the '679 patent cited by the Examiner does not teach or suggest a file that describes a layer of an integrated circuit that is created by reducing the hierarchy of an input data file to include a number of selected cells that define polygons as well as polygons or portions thereof that are defined in non-selected cells having placements that overlap the placements of selected cells and one or more remainder cells that define polygons or portions thereof not defined in the selected cells and creating a file for use by the mask writer that describes the layout of the integrated circuit by including the selected cells and the one or more remainder cells and their placements. Therefore, Claim 49 is allowable.

As discussed in the telephone interview, the present invention does not maintain the entire hierarchy of an input data file from start to finish, but instead selectively reduces the hierarchy to retain some of the data compression benefits of a hierarchical description without completely flattening the file. Because it appears that the Examiner may not have appreciated this aspect of the present invention, it is requested that the Examiner withdraw the finality of the
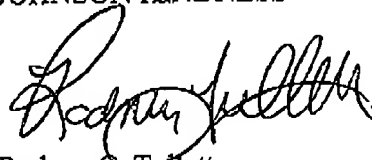
///

///

///

-15-

Office Action, enter the present amendment, and pass this case to issue at the earliest possible date. If the Examiner has any additional questions regarding the application, she is invited to call applicants' attorney at the number listed below.

Respectfully submitted,
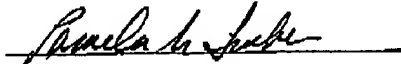
CHRISTENSEN O'CONNOR
JOHNSON KINDNESS PLLC

Rodney C. Tullett
Registration No. 34,034
Direct Dial No. 206.695.1730

I hereby certify that this correspondence is being transmitted via facsimile to the U.S. Patent and Trademark Office, Group Art Unit 2815, Examiner C.C. Chu, at facsimile number 703-872-9306 on August 20, 2004.

Date: August 30, 2004

RCT:pt

LAW OFFICES OF
CHRISTENSEN O'CONNOR JOHNSON KINDNESS PLLC
1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

-16-